

**DESCRIPTION**

DATA PROCESSOR

**ORIGINAL**

**TECHNICAL FIELD**

5 The present invention relates to the technique of acquiring information about a broadcast content to be recorded (such as the title of a program) and also relates to the technique of controlling the execution of scheduled recording of a broadcast content in accordance with the  
10 information acquired.

**BACKGROUND ART**

In recent years, as digital broadcasting and the Internet have become even more popular, electronic program  
15 guides (EPGs) are provided through these media at an increasing number of opportunities and known to more and more people. By using EPGs, the user can easily browse or search a list of programs, select a program for future recording, for example, and entitle a recorded program.

20 In a conventional analog broadcast, for example, program

information is superposed on analog broadcast wave in a gap between vertical blanking intervals (VBIs). When a TV, a VCR or any other appliance receives this program information and makes a database of the list of programs, the user can use 5 the EPG functions.

On the other hand, in a Japanese BS digital broadcast, not only the audiovisual and other data representing the contents of a program but also the information about the program are transmitted as well. In this case, the "program 10 information" includes the title, category and performers of the program and other pieces of information about the contents of the program. When an appliance that can receive a BS digital broadcast compiles a list of programs based on the program information, the user can not only browse and search 15 the list of programs but also select a program for recording by combining that receiver with a recorder.

As still another example, there are some websites on the Internet that allow the users to browse EPGs describing the broadcasting schedule of programs and the program information 20 described above. By using a browser function installed in a

personal computer (which will be abbreviated herein as a "PC"), for example, the user can connect to one of those sites, get an EPG displayed on a monitor screen and browse the EPG. Also, by making the PC and a recorder cooperate 5 with each other, the user can also select a program for recording and get the scheduled recording executed. Furthermore, either by combining the PC with an external recorder such as a VTR or by using the PC by itself if the PC has a video recording capability, the user can select a 10 program for recording and record the program.

Japanese Laid-Open Publication No. 10-40603 discloses a system that allows the user to select a program for recording, record the program and view it by using a PC.

FIG. 1 shows an arrangement of functional blocks for a 15 PC 10 for use in a conventional recording scheduling system. The PC 10 includes a buffer 1, a program list compiling section 2, a display section 3, a search section 4, a scheduling section 5, a scheduling information storage section 6, a control information output section 7 and a VCR 20 status checking section 8.

These components of the PC 10 have the following functions and operate as follows. Specifically, the buffer 1 retains program list data 30 about the list of broadcast programs. The PC 10 acquires this program list data 30 5 through a network such as the Internet or from a storage medium such as a CD-ROM. The program list compiling section 2 compiles a list of programs based on the program list data 30 such that the user can browse the list of programs or use it via the search section 4.

10 The user can extract various data items including the title, scheduled start time, channel number, category (e.g., news, movie, sports and so on) and performers of the program from the list of programs. The PC 10 presents the list of programs thus compiled as a day-by-day arrangement of 15 programs on the display section 3 such as a display. The user selects his or her desired program to be recorded from the presented arrangement of programs using a mouse (not shown) connected to the PC 10 or any other appropriate input device, thereby determining a broadcast program to select and 20 to videotape.

Instead of directly designating them with a mouse, the user can also search the list of programs with the title, category (e.g., news, movie, drama and so on) or performers of the program, for example. The search section 4 receives 5 an input keyword such as the title or a performer of a program and searches the list of programs with the keyword. As a result of the search, the programs are automatically screened and candidates of programs to select are shown on the display section 3. Then, the user picks his or her 10 desired program(s) from the candidates on the screen with a mouse, for example.

The scheduling section 5 performs the scheduling processing of the program that has been either designated directly, or selected from among a number of candidates, by 15 the user. The scheduling information storage section 6 stores various pieces of information (e.g., program start and end times and broadcaster's channel number) that should be transmitted to a TV and/or a VCR 20 to activate the TV/VCR 20 and get the selected program recorded.

20 When it's the scheduled recording start time, the

control information output section 7 asks the VCR status checking section 8 whether or not the VCR 20 can perform the target processing (e.g., videotaping). If the answer is YES, then the control information output section 7 transmits 5 control information for turning the TV 20 ON and control information for specifying the channel number to the TV 20. When the user selects a program for recording, the control information output section 7 transmits control information for turning the VCR 20 ON, control information for specifying 10 the channel number and control information for instructing the VCR 20 to start recording the program. When it's the scheduled recording end time, the control information output section 7 also transmits a control signal for ending the videotaping operation.

15 In response to the inquiry from the control information output section 7, the VCR status checking section 8 checks the status of the VCR, i.e., whether the VCR can start recording immediately or is currently engaged in another job and cannot respond. Based on that status, the VCR status 20 checking section 8 outputs a signal, representing whether or

not the VCR 20 can perform the target processing, to the VCR

20. According to this processing method, after having searched, the user chooses his or her desired program from a list of candidate TV programs shown on the display of the PC

5 10, thereby shortening the time it takes to select and list a program for recording. Also, at the recording start and end times, the PC 10 sends a turn ON signal, a channel specifying signal and recording start/end signals to the VCR 20. In this manner, the user can also perform recording, playback or 10 any other operation while the VCR is on standby to fulfill the scheduled recording.

However, to use the program information with a conventional appliance, that appliance must have the function of setting up a list of programs. In other words, unless the 15 appliance is equipped with hardware and software that are needed to acquire the program information for setting up a list of programs, actually set up the list of programs, and extract the program information, the user cannot use the program information.

20 Furthermore, when a recording operation (including a

scheduled recording operation) is carried out by making a PC, for example, and a recorder cooperate with each other, only the channel number information, recording start time and other control information can be transmitted from the PC to 5 the recorder under the current state of the art. Thus, the user can identify the recorded programs just by the channel number or recording date, which is not convenient for the user.

Furthermore, in using the program information, the 10 appliance cannot receive necessary up-to-date data at its own request or may receive it even when it does not want it. For example, the program information superposed on an analog broadcast wave is normally updated just five times a day. Accordingly, it is difficult for the appliance to cope with a 15 change of program broadcasting schedule swiftly enough. Meanwhile, the program information superposed on BS digital broadcasting is updated as frequently as once in several minutes. Thus, a heavy processing load is placed on the receiver. That is to say, in order to use the program 20 information fully, the receiver needs to have high processing

performance.

This problem never arises in a PC that does not use program information on a broadcast wave. However, if a PC uses the broadcast program information, then another problem 5 will occur. Specifically, it is when the user selects a program for recording that the program list data should be acquired. Accordingly, if the program broadcasting schedule has been changed for some reason on the transmitting end after the user has selected his or her desired program, then 10 that change cannot be coped with. Thus, the actual recording should be carried out in accordance with the program information at the time of program selection and the user may be unable to record his or her desired program.

Thus, an object of the present invention is to provide 15 an apparatus that does not need the function of compiling a list of programs but that can acquire and use program information almost in real time. Another object of the present invention is to provide an apparatus that provides an increased degree of convenience for the user by recording a 20 program by using the program information.

## DISCLOSURE OF INVENTION

A data processor according to the present invention operates by being connected to a network, to which a database 5 and at least one server are also connected. The database is provided to store program specific information, which is made up of a number of parameters to designate a particular program. The at least one server is provided to search the program specific information in the database by reference to 10 searching data, thereby extracting at least one of the parameters. The data processor includes: a user interfacing section for receiving searching data on a program to be recorded from the user; a control section for transmitting the searching data to the server and receiving a parameter 15 that has been extracted by the server; and a recording section for recording the received parameter and the program to be recorded on a storage medium so that the parameter and the program are associated with each other.

The database may store, as the parameters, title 20 information representing the title of a program, broadcaster

information identifying the broadcaster of the program, and date/time information showing the date and time of the program. The user interfacing section may get, as the searching data, information on the broadcaster and scheduled 5 broadcasting date and time of the program to be recorded. The control section may receive the title information that has been extracted by the server by reference to the searching data.

The user interfacing section may get date/time 10 information specifying a predetermined period, and the control section may receive the title information of programs to be broadcast during the predetermined period from the broadcaster identified by the broadcaster information.

The recording section may record the title information 15 of the programs and the programs themselves during the predetermined period so that the programs and the title information are associated with each other.

The user interfacing section may get date/time 20 information represented by a specified time, and the control section may receive the title information of a program to be

broadcast during a broadcasting period, including the specified time, by the broadcaster identified by the broadcaster information.

The control section may further receive parameters 5 specifying start and end times of the broadcasting period of the program from the server, and the recording section may record the title information of the program and the program itself during the broadcasting period, specified by the parameters, so that the program and the title information are 10 associated with each other.

The database may further store an identifier, which identifies each said program from the other programs, as another parameter making up the program specific information.

The control section may receive not only the title 15 information of the program but also the identifier thereof, transmit the identifier to the server before the predetermined period begins so as to receive the date/time information of the program, having the identifier, from the server, and determine whether or not the received date/time 20 information shows the same period of time as the

predetermined period. If the date/time information shows the same period of time as the predetermined period, then the recording section may record the title information of the program and the program itself during the predetermined 5 period.

The database may further store an identifier, which identifies each said program from the other programs, as another parameter making up the program specific information.

The control section may receive not only the title 10 information of the program but also the identifier thereof, transmit the identifier to the server before the predetermined period begins so as to receive the date/time information of the program, having the identifier, from the server, and determine whether or not the received date/time 15 information shows the same period of time as the predetermined period. Unless the date/time information shows the same period of time as the predetermined period, the predetermined period may be changed in accordance with updated date/time information that has been obtained after 20 the identifier was transmitted.

The database may further store additional information on at least one of the contents, performers and category of the program as another parameter, and the control section may receive the additional information that has been further 5 extracted by the server by reference to the searching data.

A data processing method according to the present invention is used in a data processor connected to a network, to which a database and at least one server are also connected. The database is provided to store program specific 10 information, which is made up of a number of parameters to designate a particular program. The at least one server is provided to search the program specific information in the database by reference to searching data, thereby extracting at least one of the parameters. The data processing method 15 includes the steps of: receiving searching data on a program to be recorded from the user; transmitting the searching data to the server and receiving a parameter that has been extracted by the server; and recording the received parameter and the program to be recorded on a storage medium so that 20 the parameter and the program are associated with each other.

The database may store, as the parameters, title information representing the title of a program, broadcaster information identifying the broadcaster of the program, and date/time information showing the date and time of the 5 program. The step of receiving the searching data may include getting, as the searching data, information on the broadcaster and scheduled broadcasting date and time of the program to be recorded, and the step of receiving the parameter may include receiving the title information that 10 has been extracted by the server by reference to the searching data.

The step of receiving the searching data may include getting date/time information specifying a predetermined period, and the step of receiving the parameter may include 15 receiving the title information of programs to be broadcast during the predetermined period from the broadcaster identified by the broadcaster information.

The step of recording may include recording the title information of the programs and the programs themselves 20 during the predetermined period so that the programs and the

title information are associated with each other.

The step of receiving the searching data may include getting date/time information represented by a specified time, and the step of receiving the parameter may include 5 receiving the title information of a program to be broadcast during a broadcasting period, including the specified time, by the broadcaster identified by the broadcaster information.

The step of receiving the parameter may further include receiving parameters specifying start and end times of the 10 broadcasting period of the program from the server, and the step of recording may include recording the title information of the program and the program itself during the broadcasting period, specified by the parameters, so that the program and the title information are associated with each other.

15 The database may further store an identifier, which identifies each said program from the other programs, as another parameter making up the program specific information.

The step of receiving the parameter may include the steps of: receiving not only the title information of the program but

20 also the identifier thereof; transmitting the identifier to

the server before the predetermined period begins so as to receive the date/time information of the program, having the identifier, from the server; and determining whether or not the received date/time information shows the same period of 5 time as the predetermined period. If the date/time information shows the same period of time as the predetermined period, then the step of recording may include recording the title information of the program and the program itself during the predetermined period.

10 The database may further store an identifier, which identifies each said program from the other programs, as another parameter making up the program specific information.

The step of receiving the parameter may include the steps of:

receiving not only the title information of the program but

15 also the identifier thereof; transmitting the identifier to the server before the predetermined period begins so as to receive the date/time information of the program, having the identifier, from the server; and determining whether or not the received date/time information shows the same period of

20 time as the predetermined period. Unless the date/time

information shows the same period of time as the predetermined period, the step of receiving the parameter may further include the step of changing the predetermined period in accordance with updated date/time information that has 5 been obtained after the identifier was transmitted.

The database may further store additional information on at least one of the contents, performers and category of the program as another parameter, and the step of receiving the parameter may include receiving the additional information 10 that has been further extracted by the server by reference to the searching data.

A data processing system according to the present invention includes a server, a database and a data processor, which are all connected to a network. The database is 15 provided to store program specific information, which is made up of a number of parameters to designate a particular program. The server is provided to search the program specific information in the database by reference to searching data, thereby extracting at least one of the 20 parameters. The data processor includes: a user interfacing

section for receiving searching data on a program to be recorded from the user; a control section for transmitting the searching data to the server and receiving a parameter that has been extracted by the server; and a recording 5 section for recording the received parameter and the program to be recorded on a storage medium so that the parameter and the program are associated with each other.

#### BRIEF DESCRIPTION OF DRAWINGS

10 FIG. 1 shows an arrangement of functional blocks for a PC 10 for use in a conventional recording scheduling system.

FIG. 2 shows a configuration for a data processing system 90 according to an embodiment of the present invention.

15 FIG. 3 shows an arrangement of functional blocks mainly for the system control section 300.

FIG. 4 is a flowchart showing the procedure of selecting and listing a program for recording for an HDD recorder 200.

FIG. 5(a) shows an exemplary scheduling/listing window.

20 FIG. 5(b) shows an exemplary input area 51 in which various parameters have been input.

FIG. 5(c) shows a title area 55 in which the title of a program is presented.

FIG. 5(d) shows an area 58 in which "enter" is highlighted.

5 FIG. 6 shows the flow of data in a title finding process.

FIGS. 7(a) through 7(d) show a second exemplary scheduling/listing window according to the embodiment.

FIG. 8 is a flowchart showing how the HDD recorder 200 performs the scheduling/listing procedure.

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#### BEST MODE FOR CARRYING OUT THE INVENTION

Hereinafter, preferred embodiments of the present invention will be described with reference to the accompanying drawings.

15 EMBODIMENT 1

FIG. 2 shows a configuration for a data processing system 90 according to the first embodiment of the present invention.

The data processing system 90 includes at least one broadcaster 100, a network 101, a program list database 102, a search engine 103, a router 104, a display device 105, and a

hard disk recorder (HDD recorder) 200.

First, it will be outlined what type of processing the data processing system 90 performs. One of the prime features of the data processing system 90 is that in recording a 5 program, the HDD recorder 200 gets the title and other information of the program without using the conventional EPG and records the program with that information associated with the program.

For example, the user of this HDD recorder 200 can select 10 a program for future recording roughly as follows. First, he or she enters his or her specified searching data (i.e., search criteria such as a channel number and a broadcasting date and time). Then, the HDD recorder 200 transmits the searching data to the search engine 103 through the network 15 101. By reference to the searching data received, the search engine 103 searches the program list database 102. In the program list database 102, program specific information, identifying programs to be broadcast, has been collected. The program specific information is made up of a number of 20 parameters including the channel number, broadcasting date and

time, and title of each program. If a program, having parameters that match the searching data, has been found as a result of the search, then the search engine 103 retrieves the title data of that program, for example, from the program list 5 database 102. Alternatively or additionally, the search engine 103 may also acquire data about the exact broadcasting start and end times of that program. These data are further transmitted from the search engine 103 to the HDD recorder 200.

10 The HDD recorder 200 receives the program title and other data from the search engine 103. When it's the scheduled broadcasting date and time, the HDD recorder 200 starts recording that program and the received data on a hard disk with the program and the data associated with each other. For 15 example, if the program requested is yet to be broadcast, then the program is selected and listed for recording along with its title. When the broadcasting date and time has arrived, that program will be recorded along with its title. Meanwhile, if the program requested is now being broadcast, 20 then the program starts being recorded immediately along with

its title.

Hereinafter, the functions of respective components that makes up the data processing system 90 will be described first. After that, it will be described in detail what type 5 of processing the data processing system 90 performs (and how the HDD recorder 200 works among other things).

First of all, the network 101 may be the Internet and connects together the broadcasters 100, program list database 102, search engine 103 and HDD recorder 200 with the router 10 104 so that communications can be done from any one of these to another.

The broadcaster 100 transmits a broadcasting content (i.e., a program) on analog broadcast wave, for example. In many cases, there are a number of broadcasters 100. Also, the 15 broadcaster 100 outputs information about the arrangement of its own programs to the program list database 102 at regular intervals, and gets the information stored there. Furthermore, if the arrangement of its own programs were changed, then the broadcaster 100 would output information 20 about the modified program arrangement to the program list

database 102, thereby updating the information stored on the program list database 102. As used herein, the "program arrangement" refers to the broadcasting schedule of programs, i.e., information about what programs will be broadcast when.

5 The program list database 102 (which will be abbreviated herein as the "program list DB 102") accumulates the program specific information about the specific parameters of the programs that has been transmitted from the broadcasters 100. The program specific information is provided on respective 10 programs that were, are, and will be, broadcast during a predetermined period of time. The "program specific information" is information to identify each of the programs arranged and includes a number of parameters. The following 15 Table 1 shows examples of program specific information being managed on the program list database 102. In Table 1, each row represents an item of the program specific information and each column represents one of the parameters that make up the program specific information:

Table 1

Date of broadcast	Channel #	Start time	End Time	Title	Category
...	...	...	...	...	...
Feb-01-04	2	7:00	7:45	Morning News	News
Feb-01-04	4	7:00	7:15	Soap Opera X	Melodrama
...	...	...	...	...	...
Feb-10-04	6	19:00	21:24	NPB game A against B	Sports
Feb-10-04	8	19:00	20:00	Movie Theater Y	Movies
Feb-10-04	10	19:00	...	...	...
...	...	...	...	...	...

As shown in Table 1, examples of the parameters include broadcaster information (e.g., the channel number) to identify the broadcaster of a program, broadcasting date/time information indicating the broadcasting date and time of the program, title information showing the title of the program, and additional information about the category of the program. Alternatively or additionally, the additional information may include the performers or summary of the program, the links with URL's for more detailed associated information, and other contents-related information of that program. The broadcaster

or its affiliate company does maintenance (e.g., updating the data with the passage of time or upon the change of the program arrangement) on the program list DB 102. Thus, the search engine 103 (to be described later) can always retrieve 5 necessary information from the up-to-date program list DB 102.

The search engine 103 receives a portion of the searching data, which has been entered by the user of the HDD recorder 200, as a search key to search the program specific information. In response, by reference to the searching data 10 received, the search engine 103 searches the program list DB 102, thereby extracting at least one of the parameters that make up the program specific information of that program. In this case, the search engine 103 may extract either all of the parameters including the one corresponding to the searching 15 data entered or a parameter different from the one corresponding to the searching data. For example, suppose the search engine 103 has received broadcaster information and broadcasting date/time information as the searching data. In that case, the search engine 103 finds an item of program 20 specific information that meets these criteria and extracts

the title information that makes up the program specific information.

In this description, the search engine 103 is supposed to search the program list DB 102. Optionally, both the program 5 list DB 102 and search engine 103 may be implemented as servers on the Internet so as to be accessed by any other server or client on the Net. In that case, the server of the program list DB 102 may receive the searching data from the search engine 103, search its database and output the search 10 results to the search engine 103.

The router 104 connects an appliance to the network 101, defines a route of transmitting packets to the appliance on the receiving end, and then transmits them to the recipient. The display device 105 presents video thereon and outputs 15 sound through its attached loudspeakers.

The HDD recorder 200 records a program that has been transmitted by the broadcaster 100 on a hard disk and plays back the data of the recorded program. Optionally, the HDD recorder may have the function of writing data on any other 20 storage medium (e.g., a DVD). In that case, the user can pick

either the hard disk or the DVD as his or her desired storage.

The HDD recorder 200 includes a tuner 201, an A/D converter 202, an MPEG-2 encoder 203, a hard disk drive (HDD) control section 204, a hard disk drive (HDD) 205, an MPEG-2 decoder 206, a graphics control section 207, a memory 208, a D/A converter 209, a CPU bus 213, a network control section 214, an operating switch 215 and a system control section 300.

The tuner 201 tunes itself to, and receives, broadcast wave that has been transmitted from the broadcaster 100 and 10 outputs the video and audio signals of the content to the A/D converter 202, which converts the input signals into digital ones and supplies them to the MPEG-2 encoder 203. In response, the MPEG-2 encoder 203 compresses and encodes the supplied digital data into the MPEG-2 format and passes it to 15 the HDD control section 204.

The HDD control section 204 is connected to the HDD 205 and controls reading and writing of data from/on the HDD 205. More specifically, in recording a program, the HDD control section 204 sets the HDD 205 in a write enabled state and 20 writes data on the HDD 205. On the other hand, in playing

back a recorded program, the HDD control section 204 sets the HDD 205 in a read enabled state and reads data from the HDD 205. Then, the HDD control section 204 outputs the read data to the MPEG-2 decoder 206.

5       The MPEG-2 decoder 206 expands the MPEG-2 compression-encoded data supplied, converts it into decompressed data and then passes it to the graphics control section 207. The graphics control section 207 is connected to the internal computer memory 208 and realizes an on-screen display (OSD) function. For example, the graphics control section 207 combines any of various menu pictures with the video and outputs the resultant synthetic image to the D/A converter 209. In response, the D/A converter 209 converts the input OSD synthetic image and audio data into analog data and 15 outputs them.

         The CPU bus 213 is a path for transferring signals in the HDD recorder 200. The tuner 201, A/D converter 202, MPEG-2 encoder 203, HDD control section 204, MPEG-2 decoder 206, graphics control section 207, and D/A converter 209 are all 20 connected to the CPU bus 213. In addition, the respective

components of the system control section 300 to be described below are also connected to the CPU bus 213.

The network control section 214 has an interfacing function for connecting the HDD recorder 200 to the network 101 and exchanges data with another component (such as the search engine 103) over the network 101. The operating switch 215 is a switch that allows the user to select a channel on, or get a recording or playback operation done by, the HDD recorder 200. The operating switch 215 further includes an input device such as a keyboard that allows the user to enter his or her searching data or a mouse that allows the user to select his or her desired searching data. The network control section 214 is connected to the CPU 211 (to be described later) of the system control section 300 by way of the CPU bus 213. On the other hand, the operating switch 215 is directly connected to the CPU 211. A signal generated by turning the operating switch 215 is supplied to the CPU 211.

The system control section 300 controls the overall processing including the flow of signals in the HDD recorder 200, and includes a program ROM 210, the CPU 211 and a memory

212, which are all connected to the CPU bus 213. A software program for controlling the HDD recorder 200 is stored in the program ROM 210.

The CPU 211 reads out and executes the program, thereby 5 generating a control signal to carry out the processing as defined by the program. Then, the CPU 211 outputs the control signal to respective components by way of the CPU bus 213. The memory 212 has a work area to store the data that is necessary for the CPU 211 to execute the program. For 10 example, the CPU 211 may execute the software program stored in the program ROM 210 by using the CPU bus 213.

Next, the functional configuration of the system control section 300 will be described.

FIG. 3 shows an arrangement of functional blocks for the 15 system control section 300. In FIG. 3, the tuner 201, graphics control section 207 and other blocks are also shown for reference.

When the CPU 211 executes the computer program stored in the program ROM 210, the respective functional blocks of the 20 system control section 300 are realized as real functions of

the CPU 211. Alternatively, each of these functional blocks may also be implemented as a hardware circuit that operates under the control of the CPU 211. In the following description, each of these functional blocks is supposed to be 5 provided as a hardware component for convenience sake. For example, the tuner control block 301 shown in FIG. 3 will be referred to herein as a "tuner control section 301". It should be noted that if these functions are implemented by means of software, they are realized by the internal 10 processing of the CPU 211.

The system control section 300 includes a tuner control section 301, a recording control section 302, a playback control section 303, a GUI display control section 304, a clock 305, a scheduling control section 306, and a data 15 acquisition control section 307.

The tuner control section 301 is connected to the tuner 201 by way of the CPU bus 213 so as to control the channel selection and reception done by the tuner 201. Also, the tuner control section 301 provides information about the 20 broadcaster currently selected for the data acquisition

control section 307. The recording control section 302 is connected to the HDD control section 204 by way of the CPU bus so as to issue an instruction to execute a write operation to the HDD control section 204. The playback control section 303 5 is connected to the HDD control section 204 by way of the CPU bus so as to issue an instruction to execute a read operation to the HDD control section 204. Furthermore, the playback control section 303 transmits the program title information of a content (i.e., a program) to be played back to the GUI 10 display control section 304 and the broadcaster information and broadcasting date/time information of the content to the data acquisition control section 307, respectively.

The GUI display control section 304 is connected to the graphics control section 207 by way of the CPU bus so as to 15 instruct the graphics control section 207 to display a GUI window on the screen. More specifically, the GUI display control section 304 transmits the OSD picture data, which will eventually be displayed on the display device 105, to the graphics control section 207. The clock 305 provides current 20 time data to the data acquisition control section 307 and

scheduling control section 306.

The scheduling control section 306 controls the listing of a program selected for recording and the execution of the scheduled recording operation. More specifically, while 5 processing the listing of a program selected for recording, the scheduling control section 306 provides selected program list information, which will be displayed on a scheduling/listing window, for the GUI display control section 304 and the broadcaster information and broadcasting date/time 10 information for the data acquisition control section 307, respectively. Then, the scheduling control section 306 retains the parameters of the selected and listed program. On the other hand, in executing the scheduled recording operation (i.e., when it's the broadcasting date and time), the 15 scheduling control section 306 sends out an instruction on a channel to be selected in executing the scheduled recording to the tuner control section 301 and an instruction to execute the scheduled recording to the recording control section 302, respectively.

20 The data acquisition control section 307 is connected to

the network control section 213 by way of the CPU bus 213 and sends out the title information of the selected and listed program to the scheduling control section 306. In the data acquisition control section 307, the address of a server, in 5 which the search engine 103 has already been constructed, is stored. Thus, when the HDD recorder 200 is connected to the web (i.e., the Internet 101), connection can be done by searching this server.

The operating switch 215 is a button or switch provided 10 for the HDD recorder 200 and is connected to the tuner control section 301, recording control section 302, playback control section 303, clock 305, and scheduling control section 306. On receiving the user's command, the operating switch 215 sends out an instruction on channel selection, recording, 15 playback, clock setting or scheduling/listing to the respective blocks connected.

Hereinafter, processing to be done by this data processing system 90 will be described. In this embodiment, this processing is carried out to select a program for future 20 recording by using the HDD recorder 200. In the following

description, not only FIG. 4 but also FIGS. 5(a) through 5(d) will be referred to when necessary.

FIG. 4 shows a procedure in which the HDD recorder 200 performs the process of selecting and listing a program to be recorded. First, in Step S401, the scheduling control section 306 receives user's command to start a scheduling/listing process of a program by way of the operating switch 215. In response, the scheduling control section 306 controls the GUI display control section 304 and graphics control section 207, thereby displaying a scheduling/listing window on the display device 105 in Step S402. FIG. 5(a) shows an exemplary scheduling/listing window. In the scheduling/listing window, areas 51 to which the user needs to input various parameters to designate a program are displayed, and the area 52 currently waiting the user's input is highlighted. In this case, the various parameters include the "recording date", "channel number (CH)" of a program to be broadcast, "start time" and "end time" of the program, "recording mode" that will determine the quality of recorded video, and "type of storage medium" showing on what storage medium the program

will have to be recorded. Among these parameters, the "recording date", "start time" and "end time" belong to broadcasting date/time information showing the recording date and time and the "channel number" of the program is 5 broadcaster information identifying the broadcaster. In the two areas 53 showing the "recording mode" and "type of storage medium", "high quality" and "HD (hard disk)" are supposed to be selected as respective defaults.

Next, in Step S403 shown in FIG. 4, the scheduling 10 control section 306 receives the user's specified broadcasting date and time, channel number and recording mode (if necessary) of a program to be recorded. FIG. 5(b) shows exemplary input areas 51 to which various parameters have been input. In FIG. 5(b), every parameter of the program to select 15 and record has been entered. In this example, the recording date of "Feb. 17" includes only month and day but may further include year as well. The clock 305 can manage not only the recording date and time but also the year as well.

Next, in Step S404, the scheduling control section 306 20 waits either a command to find the title or a command to input

the title. If the command to find the title has been entered, the process advances to Step **S405**. On the other hand, if the command to input the title has been entered, then the process jumps to Step **S409**. For example, if the "enter" button (not shown) of the operating switch **215** is pressed down while the "find title" area **54** is being highlighted as shown in FIG. 5(b), then the find title command is issued. In the same way, if the "enter" button (not shown) of the operating switch **215** is pressed down while the "input title" area is being highlighted, then the input title command is issued.

On receiving the find title command, the scheduling control section **306** performs the process of finding the title in Step **S405**. In the title finding process, the scheduling control section **306** transmits the input parameters (i.e., the broadcaster information and the broadcasting date/time information) as the searching data to the search engine **103** and obtains the search results, found by reference to the searching data, from the search engine **103**. The title finding process will be described in further detail later with reference to FIG. 6.

Next, in Step **S406**, the scheduling control section 306 determines whether or not the control section 306 has received the title data of the program as a search result. If the control section 306 has received the title data of a program of which the parameters match the searching data, then the process advances to Step **S407**. On the other hand, if the control section 306 has received error data, then the process advances to Step **S408**. The error data is transmitted from the search engine 103 if there are no programs of which the parameters match the searching data transmitted.

In Step **S407**, in accordance with the instruction of the scheduling control section 306, the title that has just been found is shown on the display device 105. FIG. 5(c) shows a title area 55 in which the title of the program is displayed.

If the error data has been received, then the scheduling control section 306 shows a message such as "no titles found" on the display device 105 in Step **S408**. After that, the process advances to Step **S409**.

In Step **S409**, the scheduling control section 306 waits either a command to input a title or a command to correct the

title. If the correct title command has been received, then the process advances to Step **S410**. Otherwise, the process jumps to Step **S411**. As shown in FIG. 5(c), if the title has been found successfully, then an area **56** prompting the user to 5 answer whether or not to correct the title is displayed. In this case, if the highlighted "N" area **57** is selected, then a command to make no corrections is entered. On the other hand, if the other "Y" area is selected, then a command to make a correction is entered.

10 In Step **S410**, the user inputs the title of the program with a software keyboard presented on the display device **105**, for example. When the scheduling control section **306** receives the title, the process advances to Step **S411**. In Step **S411**, the scheduling control section **306** waits a command on whether 15 or not the scheduling and listing should be entered. If the answer is YES, the process advances to Step **S412**. Otherwise, the scheduling/listing process may end once and may be restarted from Step **S401** all over again. FIG. 5(d) shows an area **58** in which "enter" is highlighted. If this area is 20 selected, then the "enter" command is issued.

In Step **S412**, the scheduling control section **306** stores the selected parameters as scheduling information in an internal memory (not shown). In this example, the recording date, channel number, broadcasting start time, end time, 5 recording mode, type of storage medium selected, and title of the program are stored. Then, the scheduling/listing process ends.

Next, the title finding process to be carried out as the Step **S405** mentioned above will be described with reference to 10 FIG. 6, which shows the flow of data in the title finding process. First, a search request and search keys (i.e., searching data) as its arguments are transmitted from the HDD recorder **200** to the search engine **103**. In this case, the search keys are the broadcasting date/time information and the 15 broadcaster information. In the example illustrated in FIG. 5(b), the broadcasting date/time information includes the recording date "Feb. 17", start time "14:26" and end time "15:30" and the broadcaster information is either the channel number "8" or the name of the broadcaster. On receiving the 20 search request and the search keys, the search engine **103**

searches the program specific information in the program list DB 102 with the search keys, determines whether or not there is an item of program specific information that matches the broadcasting date/time information and broadcaster 5 information, and obtains the search results.

If the search engine 103 has found an item of program specific information including every key, then the search engine 103 acquires program title information representing the title of the program. Otherwise, the search engine 103 10 acquires error information. In any case, the search engine 103 sends the search results acquired to the HDD recorder 200 through the network 101. When the HDD recorder 200 receives those search results, the title finding process ends. In the example illustrated in FIG. 5(c), "today's dishes" has been 15 acquired as the program title information.

By performing the process described above, the title of the program in question is found while the user is listing that program. When the broadcasting start time has come, the HDD control section 204 will record the program and its title 20 on the hard disk drive with the program and its title

associated with each other under the control of the recording control section 302. As a result, the scheduled recording of the program is executed. The HDD recorder 200 can display a list of recorded programs. In the list, not only the 5 recording date and time but also the title of the program may be displayed, or just the titles may be displayed. Then, the user can easily identify the recorded programs by their titles, not just by the recording dates and times and channel numbers.

10 In the example that has just been described with reference to FIGS. 5(a) through 5(d), the broadcasting date/time information as the search key is supposed to be made up of the broadcasting date, broadcasting start time and broadcasting end time. Alternatively, the broadcasting 15 date/time information may also be made up of the broadcasting date and a particular time.

FIGS. 7(a) through 7(d) show a second exemplary scheduling/listing window according to this embodiment. This example relates to a scheduling/listing process for selecting 20 a program to be recorded by searching for multiple programs

that include a particular time (i.e., an time) during their broadcasting periods.

When a recording scheduling operation has been done with the operating switch 215, the scheduling control section 306 5 instructs the GUI display control section 304 to open a recording scheduling window in response to an operation request. The GUI display control section 304 controls the OSD drawing operation of the graphics control section 207. Then, the display device 105 displays a recording scheduling/listing 10 window such as that shown in FIG. 7(a). In the recording scheduling/listing window, an area 71 that makes the user specify a particular time (i.e., a midway time) as a piece of the broadcasting date/time information is displayed. Suppose the user has entered "Apr. 1, 21:15" in the area 72 and 15 channel number "10" in the area 73, respectively, as shown in FIG. 7(b). In that case, when the "enter" button (not shown) of the operating switch 215 is pressed down while the "program search" area 74 is being highlighted, a title finding command is issued.

20 On receiving the title finding command, the scheduling

control section 306 performs a title finding process. Specifically, the scheduling control section 306 transmits the entered broadcaster information and date/time information as the searching data to the search engine 103 by way of the data

5 acquisition control section 307 and network control section 214. In the example illustrated in FIG. 7(b), the broadcaster information is "10" and the time information is "Apr. 1, 21:15".

The search engine 103 searches the program specific information by reference to the broadcasting date and broadcaster information first, thereby finding multiple sets of program specific information that meet each of these criteria. Next, the search engine 103 narrows the results so as to acquire program specific information of which the broadcasting start time is ahead of the midway time and the broadcasting end time is behind the midway time. As a result 15 of the search, the search engine 103 acquires not only the title information of the program but also the broadcasting start and end times thereof as well, and transmits them to the 20 HDD recorder 200.

The scheduling control section 306 displays the received search results in the scheduling/listing window as shown in FIG. 7(c). The start and end times discovered are shown in the areas 75 and 76, respectively, and the title of the 5 program is also shown in the area 77. To select a program to be recorded just as proposed on the screen, the user may press down the "enter" button (not shown) of the operating switch 215 while the "enter" area 78 is being highlighted. Then, commands are issued so as to select and list a program for 10 recording in accordance with the parameters specified. More specifically, the scheduling control section 306 selects a program to be recorded in accordance with the user's entered broadcaster information and the broadcasting start and end time information that has been acquired as search results. 15 FIG. 7(d) shows an exemplary window showing a message that the program to be recorded has been selected successfully. Thereafter, when the broadcasting start time of the selected and listed program has come, that program will start being recorded. When the end time is reached, the recording will be 20 stopped.

In this second scheduling/listing procedure, a program to be recorded may be selected and listed according to the midway time. That is to say, as long as at least a rough broadcasting time range is known, the user can select and list 5 a program to be recorded even if he or she does not know its detailed broadcasting start and end times. As a result, the degree of convenience increases for the user. Also, in displaying a list of selected programs, the titles of the programs can be displayed and the recorded programs can also 10 be entitled, too. Consequently, the HDD recorder 200 allows the user to make a search much more easily.

It should be noted that if only a rough broadcasting time range is known but if the broadcaster's name is unknown, then program specific information may be acquired from a number of, 15 or even all, broadcasters at a time so that the user may select a program. Also, multiple sets of program specific information about the programs to be broadcast during a predetermined period may be acquired at a time so that the user may pick one of those candidate programs.

20 In the embodiment described above, a selected program is

supposed to be recorded from its broadcasting start time. Optionally, to record a selected program from its very beginning without missing any part of it, the "broadcasting start time" may be set somewhat earlier than the actual 5 scheduled broadcasting start time (e.g., five minutes before the broadcasting start time) such that the program may start being recorded from the shifted broadcasting start time. However, if such a program is selected and listed for recording, then the shifted broadcasting start time will refer 10 to the previous program, and therefore, the program title information of the previous program might be acquired by mistake. Accordingly, in finding the title of the program, the title of the program that will be broadcast some time later than the preset broadcasting start time should be found. In 15 the example described above, the title of the program to be broadcast after at least five minutes have passed since the preset broadcasting start time may be found. Then, the program can be recorded with the program and its title matched correctly.

## EMBODIMENT 2

As a second embodiment, an appliance that can record a user's originally selected program even if the arrangement of 5 programs is changed after the user has selected and listed the program for recording will be described.

The program recording processing of this embodiment is realized by a system that is approximately equivalent to the data processing system 90 as described for the first 10 embodiment. Thus, this embodiment will also be described with reference to the data processing system 90 shown in FIG. 2. The differences between the first and second embodiments will be described in detail, but otherwise the statement for the first embodiment will apply as it is.

15 First of all, in this embodiment, the program list DB 102 of the data processing system 90 further includes program IDs as another type of parameters. Unique program IDs are defined on a program-by-program basis so as to identify each program from the others. The following Table 2 shows exemplary 20 program specific information to be managed on the program list

database 102 of this embodiment. Unique program IDs are assigned to the respective programs. For example, each program ID of Table 2 may have a length of 10 bytes, in which the year (i.e., the last two digits of the calendar year), 5 month, day, channel number of the broadcaster, and program identification code defined by the broadcaster may be assigned on a 2-byte basis in this order (i.e., starting from the most significant two bytes). In this manner, each program may be assigned a unique ID. It should be noted that this program ID 10 composition is just an example. Thus, the program ID may be defined according to any other standard.

Table 2

Date of broadcast	Ch.	Start time	End Time	Title	Category	Program ID
...	...	...	...	...	...	...
Feb-01-04	#2	7:00	7:45	Morning News	News	0402010205
Feb-01-04	#4	7:00	7:15	Soap Opera X	Melodrama	0402010408
...	...	...	...	...	...	...

The HDD recorder 200 of this embodiment can allow the user to select a program for future recording and then see, by using the program ID thereof, if there is any change in the 5 arrangement of programs before the selected program is actually broadcast. As used herein, the "change in the arrangement of programs" may refer to the delayed start of

broadcasting of a program in question, for example. If the HDD recorder 200 has detected no change in the arrangement of programs, then the recorder 200 will start recording the selected program at the originally scheduled broadcasting

5 start time of that program. On the other hand, if the HDD recorder 200 has sensed any change in the arrangement of programs, then the recorder 200 modifies the broadcasting start time and other parameters of the selected and listed program such that the program will start being recorded at 10 that modified time. After that, while keeping on checking whether or not there is any change in the arrangement of programs, the HDD recorder 200 will start recording the program at the modified time if no changes have been sensed in 15 the arrangement of programs.

15       Hereinafter, this processing will be described in detail with reference to FIGS. 3 and 8. First, suppose a program has already been selected and listed for recording before this processing starts. The parameters of the program listed include not only the broadcaster information (i.e., the 20 channel number), broadcasting date, broadcasting start time

and title of the program but also the program ID of that program, too, according to this embodiment.

FIG. 8 shows the procedure of a scheduling/listing process to be performed by the HDD recorder 200. First, in 5 Step S801, the scheduling control section 306 determines, by reference to the current time shown on the clock 305, whether or not it is already five minutes before the broadcasting start time of the selected program. If the answer is NO, then the scheduling control section 306 will wait until then. On 10 the other hand, if the answer is YES, then the scheduling control section 306 will carry out the processing step S802 and following processing steps. In Step S802, the scheduling control section 306 transmits not only a search request but also the program ID of the selected program, which was 15 acquired during the scheduling/listing process, as a part of the searching data to the search engine 103.

In response, the search engine 103 searches the program list DB 102, thereby acquiring the program specific information of the program to which that program ID is 20 assigned. In this case, the program specific information

acquired may be parameters on the program title information, broadcasting date, broadcasting start time, broadcasting end time and broadcaster information. The search engine 103 transmits the acquired parameters to the HDD recorder 200.

5 Next, in Step S803, the scheduling control section 306 of the HDD recorder 200 receives the search results from the search engine 103 by way of the network control section 214 and the data acquisition control section 307. Then, in Step S804, the scheduling control section 306 determines whether 10 not the program specific information received matches the parameters of the selected and listed program. If the answer is NO, the process advances to Step S805. On the other hand, if the answer is YES, the process advances to Step S806.

Suppose the start of broadcasting of the selected and 15 listed program has been delayed due to the extension of one of its previous programs, for example. In that case, the broadcaster 100 notifies the program list DB 102 of the change in the arrangement of programs. Then, in the program specific information of that program, the program ID and broadcaster 20 information remain unchanged but its broadcasting start and

end times are modified into updated ones. Accordingly, the program specific information received from the search engine 103 will be different from the parameters of the selected and listed program.

5 On the other hand, if the broadcaster 100 notifies the program list DB 102 of no change in the arrangement of programs, then the original parameters of the selected and listed programs will be kept as they are in the program list DB 102. Accordingly, the program specific information 10 received from the search engine 103 will match the parameters of the selected and listed program.

In Step S805, the scheduling control section 306 deletes the parameters of the selected and listed program once and makes a modified scheduling and listing in accordance with the 15 updated program specific information received. As a result, the user's selected program to be recorded is listed again in accordance with the newest program arrangement at that point in time. Thereafter, the process advances to Step S806.

In Step S806, by reference to the parameters of the 20 selected and listed program, the scheduling control section

306 judges that the scheduled start time has come and starts recording the program exactly at the start time.

By performing the processing described above, even if the program arrangement has been changed after a program was 5 selected and listed, the broadcasting start time can be modified according to the change and the scheduled recording of the program can be executed without fail. In addition, by judging whether or not the program title, as well as the program ID, matches, the scheduled recording can be executed 10 and the recorded program can be entitled with more reliability. It should be noted that if the broadcasting of that program has been canceled, then there will be no program specific information about the program with that program ID on the program list DB 102. In that case, the search engine 103 15 may output error information to the HDD recorder 200.

Furthermore, if the same processing as that shown in FIG. 8 is carried out while the program is still being recorded and five minutes before its scheduled end time, for example, then any change in program arrangement can be coped with even more 20 appropriately. More specifically, if there is a change in

program arrangement while the program is being broadcast and if the broadcasting of that program is extended, then the HDD recorder 200 gets a parameter on the broadcasting end time of the program being recorded by reference to the program ID 5 before the broadcasting of that program ends. If this parameter matches the counterpart of the selected and listed program, then the recording of the program may be ended in accordance with the parameters entered. Otherwise, the parameters entered are updated according to the newly acquired 10 parameter and the recording may be re-started in accordance with the parameters. Then, the program can be recorded to its very end and its recording will never end before the program itself ends.

The first embodiment was described as being applied to 15 selecting a program to be recorded. However, those statements apply to not only the situation where a selected program is recorded as scheduled but also a situation where the user has recorded, or is recording, a program by directly pressing down the recording start button that allows the user to instruct to 20 start recording the program. For example, as to the process

of finding the program title according to the first embodiment, the search engine 103 may search the program list DB 102 by reference to the broadcasting date, broadcasting start and end times and channel information so as to find the 5 titles of the past programs. Alternatively, the title of the matching program in the past may also be found by using the program ID of the second embodiment.

In the first and second embodiments described above, connection to the network 101 such as the Internet is supposed 10 to be done directly by way of only the router. Alternatively, the connection may also be established either by way of ADSL, ISDN or an analog modem or wirelessly with a wireless LAN or a cell phone, for example.

As described above, according to the present invention, 15 the recorder can acquire additional information of a program, including its title, based on the times and broadcaster name by using a simple configuration, or without storing program list data in itself. Thus, the following effects are achieved.

20 Specifically, according to the present invention, even

without providing the EPG capability for the recorder itself (i.e., with a simplified configuration), the user can confirm the title of a program being selected and listed and yet to be recorded, for example, just by entering the information 5 specifying the times and broadcaster. Also, even if the exact start and end times of the program are unknown, detailed additional information may also be available just by entering a specific time during the broadcasting of that program.

In addition, according to the present invention, a 10 program being recorded or a program that was recorded in the past may be entitled automatically. As a result, any recorded content can be searched for easily.

Furthermore, according to the present invention, the program information database is not allowed to accumulate data 15 there endlessly but is updated occasionally at the time of operation or control. Accordingly, if there is any change in the database on the transmitting end, update can be made swiftly enough to catch up with the change. As a result, even if the program arrangement has been changed, the operation of 20 finding the title of the program can also be carried out

almost in real time and the scheduled recording can be controlled highly accurately.

The functions of the data processor that has been described as the HDD recorder may be implemented by a computer 5 program that defines the processing procedure shown in FIG. 4 or 8. By executing such a computer program, the computer in the data processor can operate the respective components of the data processor and realize the processing described above. The computer program may be either circulated on the market 10 after having been stored on a CD-ROM or any other appropriate storage medium or downloaded via telecommunications lines such as the Internet. Then, the computer system may operate as a player having the same function as the data processor described above.

15

#### INDUSTRIAL APPLICABILITY

The present invention provides an apparatus that can acquire and use some information on a program (such as the title and broadcasting date and time thereof) in real time 20 without compiling an electronic program guide. The present

invention also provides an apparatus that contributes to increasing the users' convenience by recording the program by taking advantage of such information.